CONSUMER ATTITUDE AND PURCHASE INTENTIONS TOWARDS SOLAR RENEWABLE ENERGY PRODUCTS

A

Synopsis

Submitted in partial fulfilment of the requirements for the award of the degree of

DOCTOR OF PHILOSOPHY

In

MANAGEMENT

Submitted By

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2021

SECTION 1

INTRODUCTION

1.1 Solar Renewable Energy in India

Solar energy is a clean, and low-cost, renewable source of energy, which can be obtained nearly everywhere in the world. Solar energy represents a limitless source of power comes from the sun. India is blessed with vast solar energy potential. About 5,000 trillion kWh per year energy is incident over India's land area with most parts receiving 4-7 kWh per sq. m per day (India, 2019). As stated by (Energy, 2020), if theoretically, a small fraction of the total incident solar energy (if captured effectively) can meet the entire country's power requirements. Up to 150 million households could be in the market for solar home systems by 2020(McKinsey &co.).

During January-March 2019, solar sector received an investment of US$ 2.8 billion. As per, (India, 2019)The Government of India allocated Rs 3,004.90 crore (US$ 416.48 million) in the budget 2019-20 for development of solar power projects including both grid-interactive and off-grid and decentralized categories**.** Also, according to the Energy Boost report,large solar farms will cross the 10,000MW of the generation capacity for the first time in 2019.It been further forecasted and predicted that, the solar demand in India to go up 70,000 MW in 2022. (Research, 2020)

In terms of human dimensions, Renewable energy can be defined as the primary energies that are considered to be inexhaustible. It can be further summed up as an energy source that, replaced by natural resources and can be used directly, or created into other forms of energy that are more convenient to use.

By the numbers India is on progress to its Renewable Energy Target. The renewable energy space in India has become very attractive from investors' perspective and has received FDI investment. The sources of Renewable Energy, are the sources that constantly replacing through natural phenomenon. Renewable sources are also termed as Alternative sources, as they are a fuel option that, replacing non-conventional Non-Renewable fossil fuels. Various sources according to (Energysage, 2019) are Solar Energy, Wind Power, Hydroelectricity, Geothermal Energy, Biomass.

The (Energy, 2020),has come up with New Technologies of Renewable Energy, and conducted various programs. The new source are: Hydrogen Energy, Chemical sources of Energy, Battery

operated Vehicles, Ocean Energy, and Bio fuel. As part of these programs, research, development and demonstration projects have been initiated at various research, scientific and educational institutes, universities, national laboratories, industry, etc.

Renewable Energy credentials in India:

As India looks to meet its energy demand on its own, which is expected to reach 15,820 TWH by 2040, renewable energy is set to play an important role. By 2030, renewable sources are expected to help meet 40 per cent of India's power needs. In the first half of 2018, investments in clean energy in India reached US$ 7.4 billion, as per the data given by Ministry of New and Renewable Energy.

The Indian renewable energy is ranked fourth in wind power, fifth in solar power and fifth in renewable power installed capacity as of 2018. India ranked third in EY Renewable Energy Country Attractive Index 2019. The renewable energy will account 55 per cent of the total installed power capacity by 2030. The renewable energy sector's capacity during the first quarter of fiscal year 2019-20 is higher at 2,151 MW, which it creates a massive inclination to adopt renewable sourced of energies in day to day life **,**and thus given a major threshold for the Renewable sector in India ,as the market players and stakeholders have much incentives to drift towards "Clean Energy" (India, 2019).

1.2Solar Renewable Energy Products in India:

Solar power comes with innumerable benefits both to the mankind and environment. One can take the benefits by having diverse range of solar products available in India. So, below is a list of products powered by sunlight, either directly or through electricity generated by solar panels:

- Solar air conditioner
- Solar balloon
- Solar charger
- Solar cooker
- Solar dryer
- Solar-powered fan
- Solar furnace
- Solar vehicle
- Solar Rooftop panels

- Solar water heater etc.

Solar Energy in North India:

Going solar has a wide range of economic, environmental and personal benefits. It is aptly stated in CII Report. The CII report('State Renewable Energy Policies: A Comparative Study'), said that all northern states have come up with sector-specific policies to promote renewable energy. States that are counted in the northern region are Jammu and Kashmir, Punjab, Haryana, Uttar Pradesh, Himachal Pradesh, Rajasthan, Delhi and Chandigarh. As per the report, the northern region accounts for about 20.49%, which is about 10,247 MW, of the 50,018 MW overall installed capacity of renewable power in India (till 31 December 2016). The northern states, in specific, already have and in the future will play a pivotal role in achieving the renewable energy target set out by the government," the study said.

The potential of northern region in the renewable space is huge with about 363 GW available to be exploited. Amongst the northern States, Rajasthan has the biggest renewable potential at142, 310 MW, and is followed by Jammu and Kashmir (118,208 MW), Himachal Pradesh (36,446 MW), Uttar Pradesh (27,593 MW), Uttarakhand (19,071 MW), Punjab (6,768 MW), Haryana (6,470 MW), Delhi (2,181 MW) and Chandigarh (6 MW).

The other achievement for the North Region comes with the Announcement of (Energy, 2020)that, city Agra, is to become the country's first solar city. The Indian government (Energy, 2020),has approved plans to build 2,000 kWp of capacity in the city, around 10% of it's current consumption, which will come from a variety of sources. These include over 1.5 million gallons of heated water per day, 6400 solar street lights, 4600 solar cookers, and 20 solar traffic lights. Also, Over 30% of the planned energy savings will come from installing solar water heating into homes while another 35% will come from domestic energy efficiency measures like phasing out incandescent light bulbs and upgrading air conditioning and refrigeration units.

According to (International, 2018), Under Deen Dayal Upadhyay Solar Light (DDUSL) Scheme, 255 streetlights will be installed in 30 villages of Agra. The adoption of Solar power is at pinnacle in Agra, which can be essence at Dayalbagh Educational Institute, where the whole campus embellished with Solar Technologies. The expansion in diversified areas are as:

1. Solar-Agriculture Farm with multiple land-use to increase the farmer's income
2. Hybrid AC/DC Smart Micro grid for integration of diverse renewable energy resources with utility grid and rational end use of renewable energy in the micro grid.
3. Development of solar powered value chain machinery for agriculture and dairying for empowering farmers (https://www.dei.ac.in/ Solar Energy Initiatives At The DayalBagh Educational Institute).

Thus, helping in the addition to sustainable development through clean energy technologies and self-sufficiency in energy.

1.3The Technology Acceptance Model(TAM):

The TAM is an information technology framework for understanding users' adoption and use of emerging technologies particularly in the workplace environment (Davis FD, 1989). The theory postulates that a person's intent to use (acceptance of technology) and usage behavior (actual use) of a technology is predicated by the person's perceptions of the specific technology's usefulness (benefit from using the technology) and ease of use. The TAM also suggests that perceptions of usefulness and ease of use are mediated by external variables including individual differences, system characteristics, social influences, and facilitating conditions. (Jennifer portz, 2019). TAM is easier to apply, but only supplies very general information on users' opinions about a system (Mathieson, 1991).

1.4The Theory of Planned Behaviour (TPB):

Theory of planned behaviour (TPB) is a theory that links one's beliefs and behaviour (Ajzen I. , 1991). The theory is a coalescence of intentions toward attitude, subjective norms, and perceived behavioural control; which together shape an individual's behavioural intentions and behaviours and helps in understanding the relationship of intentions in performing a behaviour. These intentions are influenced by attitudes towards the behaviour, and the social pressure to perform this behaviour, termed as Social norm and control over the behaviour, referred to as behavioural control.

The Theory of Reasoned Action propounded by (Ajzen I. &., 1975); (Ajzen I. M., 1980) paved the path for the Theory of Planned Behaviour by (Ajzen I. , 1991). According to the Theory of Reasoned Action (TRA), intention of undertaking or not undertaking the behaviour is the direct predecessor to the behaviour. The intention under discussion is often a result of actions undertaken by individual to

evaluate the favourable or unfavourable performance of the behaviour (Ajzen, 1985).One prominent assumption of Theory of Reasoned Action is that, behaviour under consideration is a choice of ones' i.e. person can decide whether he she performs that behaviour or not.

The theory of planned behaviour (TPB) is one step ahead of the theory of reasoned action in the sense that it takes care of the original model's limitation to deal with incomplete volitional control, by introducing third variable known as perceived behavioural control (PBC),which indicates the ability of a person to undertake the behaviour under consideration, under the assumption that individual behaves in a rational manner considering the consequences of his or her actions (T.Ramayh, 2012). In fact, perceived behavioural control manifests the difficulty and controllability to execute specific behaviour.

Hence, Theory of Planned Behaviour been applied in Consumers been taken into consideration for this study.

1.4.1Technology Readiness

Refers to "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" (Holmes, 2010); (Parsuraman.A, 2000). Customers' propensity to embrace technology varies widely, resulting from an interplay between drivers (optimism, innovativeness) and inhibitors (discomfort, insecurity) of technology readiness.

According to previous researches it was found that Open Incubation, achieves higher Technology Readiness Level and delivers Lower Technology risk (Hasenauer, 2016). Further in the other study it was shows that, the technology readiness has significantly influence on attitude, subjective norm and perceived behavioural control (Li, 2010).

1.4.2Sustainability Orientation

Refers to the level of concern about the environmental protection and social responsibility of individuals, and consists of items that measure the underlying attitudes and personal traits on environmental protection and social responsibility (wanger, 2010).

Diverse researches been conducted in this area such as sustainable food consumption including Theory of Planned Behaviour by (Iris Vermeir, 2008); (Shrum, McCarty, & Lowrey, 1995),and finds that, green consumer to be an opinion leader and a careful shopper who seeks information on products,

including information from advertising. On the similar note, (wanger, 2010),shows the influence of sustainability orientation on Entrepreneurial Intentions, and suggest that positive Sustainability Orientation vanishes with business Experiences.

1.4.3 Purchase intentions

An outcome concerning customer behavioural decisions and thoughts on whether to buy or recommend a product or service can be defined as purchase Intentions. (Irland, 1993) mentions that a consumer's purchasing intentions are dependent upon his or her environmental attitudes.

A favourable attitude towards a product which is environmentally sustainable adds to sustainable consumption behaviour as pointed out in several studies (Chan R. , 2001); (Verbeke, 1999); (Tanner, 2003); (Vermeir, 2006). As per the study, Theory of Planned Behaviour Approach to understand the Purchasing Behaviour for Environmentally Sustainable Products (B.kumar, 2012), signifies the positive relation between attitude, perceived behavioural control on Purchase Intentions.

1.4.4 Demographics

Demographics are the data that describes the composition of a population, such as age, gender, occupation and education level, technology, purchasing power. If the decision is to avoid a particular product or company, one embodiment may offer a mechanism for alternative products and companies to be selected that meet the purchasing criteria of the consumer (PARK, 2014),. It may enable consumers to regain the purchasing power of their money to assert their wishes on the marketplace in order to both spend their money consistent with their personal preferences about company behaviour and practice and motivate change among companies and products that have benefited from the lack of transparency and lack of consumer power. Solar sector gets highly influenced by demographic character (sommerfeld, 2017).

1.4.5 Macro Environmental Factors

The Macro Environmental Factors are those factors which are external and uncontrollable factors. These factors influences Organisation's decision making and impact their performance and strategies. The various Macro Environmental Factors are as follows : Economic Factors; Legal, Political, Social Factors; Technological Factors; and Natural Forces.

1.4.5.1Environmental Uncertainty

An inability to assign probabilities as to the likelihood of future events or A lack of information about cause-effect relationships can be defined as Environmental Uncertainty (Duncan, 1972). Solar sector gets highly influenced by Environmental Uncertainty Factor such as Corona Virus Outbreak. The Corona virus outbreak came into light on December 31,2019 when China, informed the World Health Organisation about a cluster of pneumonia of an unknown case in Wuhan City in Hubei Province. Subsequently, the disease spread to more Provinces in China, and to the rest of the world. This disease created a havoc and embodied a disastrous impact on the lives and every trade of around 212 countries around the globe. The impact of corona virus on global renewable markets could make 2020 the first "down year" for solar power capacity addition, since1980s. With over 80% of solar cells and modules used in Indian projects were in casted from china. According to Bloomberg NEF, Global Solar Photovoltaic demand outlook for the February 2020, ranges from between 121 giga watts (GW) and 152GW to between 108GW and 143GW , estimating an 8% drop in its midpoint. Recent reports show that over ₹160 billion worth of solar projects could be affected. COVID-19 will affect Solar Sectors and being anticipated that prices of some Solar products, including the Panels themselves could increase in the coming months and a lack of transparency into the supply chain, beyond direct vendors, making it hard to anticipate potential disruptions. For the technology industry, the effects of the corona virus faces a new set of challenges. Supplies of materials and components ,logistics challenges, liquidity challenges loom particularly among small and medium-size enterprises (SMEs) are crucial in the upstream Technology supply chain. In a recent online survey conducted by Mercom India Research, almost 70% of the respondents said their business would be affected by over 15% due to Corona virus. 83% of the survey participants expect solar component supply shortages because of Corona virus (PRASAD, 2020). In the next few months, the phased restart of plants outside Hubei (and the slower progress of plants within Hubei) is likely to lead to challenges in securing critical parts. As inventories are run down faster, parts shortages are likely to become the new reason why solar plants in China cannot operate at full capacity. Moreover, solar plants that depend on Chinese output have not yet experienced the brunt of the initial Chinese shutdown and are likely to experience inventory whiplash in the coming weeks. Perhaps the biggest

uncertainty for supply-chain managers and production heads is customer demand. Customers that have pre-booked logistics capacity may not use it; customers may compete for prioritization in receiving a factory's output; and the unpredictability of the timing and extent of demand rebound will mean confusing signals for several weeks.

SECTION 2

LITERATURE REVIEW

2.1Literature Map

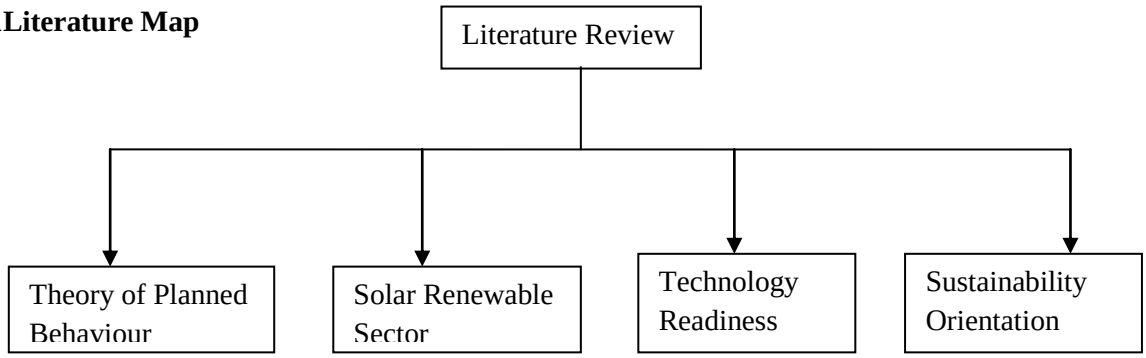

Figure1: Literature Map (Source: Self-Construct)

2.2 Conceptual coverage of Literature

The basis for this study has been adapted from The Theory of Planned Behaviour (Ajzen I. , 1991) and (B.kumar, 2012) research.

The theory of Planned Behaviour is found to be well supported by empirical evidence. Intentions to perform behaviours of different kinds can be predicted with high accuracy from attitudes toward the behaviour, subjective norms, and perceived behavioural control; and these intentions, together with perceptions of behavioural control, account for considerable variance in actual behaviour. Attitudes, subjective norms, and perceived behavioural control are shown to be related to appropriate sets of salient behavioural, and control beliefs about the behaviour, but the exact nature of these relations is still uncertain.

As per the study by (B.kumar, 2012), indicates that environmental knowledge has a significant positive relationship with the attitude towards environmentally sustainable products. The strength of significant relationship between attitude and purchase intention is greater compared to the significant relationship between perceived behavioural control and purchase intention. Subjective norm was not

found to be significantly related to purchase intention. A significant positive relationship was also found between purchase intention and purchase behaviour.

2.3 Classification of Literature Review:

A broad classification of the previous papers is given as follows:

1. **Focus of the paper:** The focus of the paper includes
    - Theory Of Planned Behaviour
    - Technology Readiness
    - Sustainability Orientation
    - Solar Renewable Energy
2. **Context of the paper:** The context of the paper includes
    - Indian
    - Foreign
3. **Type of Data for analysis:** The Type of Data for analysis includes
    - Qualitative
    - Quantitative
4. **Research Design:** The Research Design includes
    - Exploratory
    - Descriptive
    - Analytical

Table 1: Summary Table of Literature Review

Summary of Literature Review																			
		Category				Construct				Area of Study		Methodology				Context			
Title	Author (Year)	Research Paper	Article	Books	Thesis	Sustainability	Technology Readiness	Purchase Intention	Purchase Behaviour	Theory of Planned	Renewable Energy	Solar Sector in India	Descriptive	Empirical	Exploratory	Conceptual	Indian	International	
Sustaining the environment through recycling: An empirical study	T.Ramayh, j. w. (2012)	✓				✓	✓							✓				✓	
From intention to actions: A theory of planned behaviour	Ajzen, I. (1985).	✓						✓		✓						✓		✓	
The theory of planned behaviour. Organizational Behaviour and Human Decision Processes	Ajzen, I. (1991)	✓						✓	✓	✓						✓		✓	
Attitudes. In Handbook of Social Psychology	Allport, G. (1935).			✓				✓		✓			✓					✓	
Subjective norms, attitudes and intentions of Finnish consumers in buying organic food	Anssi Tarkiainen, S. S. (2005)	✓				✓		✓	✓	✓				✓		✓		✓	
Theory of Planned Behaviour Approach to Understand the Purchasing Behaviour for Environmentally Sustainable Products	B.kumar. (2012)	✓				✓			✓	✓				✓			✓		
Determinants of Chinese consumers' green purchase behaviour	Chan, R. (2001)	✓				✓		✓	✓	✓			✓			✓		✓	

Summary of Literature Review (Continued)																		
Attitude and behavioural factors in waste management in the construction industry of Malaysia	Begum, R. S. (2009)	✓				✓		✓	✓	✓				✓				✓
Mass communication and pro-environmental behaviour: waste recycling in Hong Kong/	Chan, K. (1998)	✓				✓	✓	✓		✓				✓				✓
Techno-Ready Marketing: How and Why Customers Adopt Technology	Colby, P. a. (2001)	✓					✓		✓						✓			✓
Effect of price,brand and information on buyers' product evaluation	Dodds, W., Monroe, K., & gerawal, D. (1991)	✓					✓					✓		✓		✓		✓
Ecological Behaviour, Environmental attitude and feelings of responsibilty for the environment	Florian G. Kaiser, m. R. (1999)	✓				✓		✓	✓	✓	✓	✓			✓			✓
Influence of ethical decision making in the medical profession	Gibson, R. a. (1991)	✓					✓			✓				✓				✓
Electronic transaction of internet banking and its perception of Malaysian online customers	Haque A, T. A. (2009)	✓					✓			✓						✓		✓
Technology Readiness,Market Readiness,and triple bottom line:An empirical analysis of innovating startups in an incubator	Hasenauer, G (2016)		✓				✓	✓	✓	✓				✓				✓
Influence of demographic variables on uptake of domestic solar photovoltaic technology	Sommerfeld, J (2017)	✓				✓	✓				✓	✓		✓		✓		✓
Technology Readiness	Holmes, D. C. (2010)	✓					✓									✓		✓
The green management revolution: Lessons in environmental	Hopfenbeck, W. (1993)	✓				✓	✓				✓	✓		✓		✓		✓

Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values	Iris Vermeir, W. V. (2008)	✓				✓		✓	✓	✓			✓			✓		✓
Wood producers face green marketing era: Environmentally Sound	Irland, L. (1993)				✓	✓	✓									✓		✓
The prediction of household recycling of newspapers: The role of attitudes, intentions, and situational factors	J, B. (1995)	✓				✓	✓	✓	✓	✓	✓			✓				✓
The role of perceived usefulness,perceived ease of use, security and privacy, and customer attitude toengender customer adaptation in the context of electronic banking/	Jahangir N, B. N. (2009)	✓					✓	✓	✓	✓				✓				✓
Predicting green product consumption using theoryof planned Behaviour and reasoned action	Justin paul A. M. (2016)		✓												✓			
Promoting sustainable consumption: Determinants of green	Tanner, C. &. (2003)	✓				✓		✓		✓			✓					✓
The Effect of Attitude, Dimensions of Subjective Norm, and perceived behavioural control on to the intention to purchase real state in Saudi Arabia	Tawfik Salah Al-Nahdi, O. H. (2015)	✓						✓	✓	✓				✓		✓		✓
Environmental attitude and ecological	Kaiser, G. W. (1999)		✓			✓		✓	✓	✓						✓		✓
Green marketing and Ajzen'stheory of planned behaviour: a cross-market examination	Kalafatis, S. P. (1999)	✓				✓	✓	✓	✓	✓					✓			✓
Consumer behaviour	L.G., S., & kanuk, L. (2000)	✓						✓	✓	✓					✓			✓

Consumer adoption of e-service:Integrating technology readiness with the theory of planned behaviour	Li, S.-C. C.-H. (2010)	✓					✓	✓	✓	✓				✓		✓		✓
Technology readiness and the evaluation and adoption ofself-service technologies	Liljander, et.al. (2006)	✓					✓							✓		✓		✓
A critical examination of the causal structure of the Fishbein/Ajzen/	Liska, A. (1984).	✓						✓	✓	✓				✓				✓
Recycling: Plannedandself-expressive behaviour	Lucia Mannetti, A. P. (2004)	✓				✓		✓	✓	✓	✓				✓			✓
Conservation technology adoption decisions and the theory of planned behaviour	Lynne, G. C. (1995)	✓					✓	✓	✓	✓				✓				✓
Factors Affecting Green Housing Purchase	Numraktrakul, P. N. (2012)	✓				✓		✓	✓	✓		✓		✓		✓		✓
Technology Readiness Index: a multiple Item scale to measure Readiness to embrace new technologies	Parsuraman. A. (2000)	✓					✓							✓				✓
Factors influencing home purchase intention of Thai single people	Phungwong, O. (2010)	✓						✓	✓	✓						✓		✓
Attitudes towards organic foods and risk/benefit perception associated with pesticides	Saba, A. &. (2003).	✓						✓					✓					✓
Eating clean and green? Investigating consumer motivations towards the purchase of organic food.	Samantha Smith, A. P. (2010)	✓						✓	✓		✓		✓					✓
Research methods for business students	Saunders, M. N. (2019)				✓				✓	✓			✓					✓
Promoting environmentalism	Schultz, P. &. (2000)	✓					✓				✓		✓					✓

Nearest neighbour effects in kerbside household waste recycling	Shaw, P. (2008).	✓									✓		✓					✓
The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research	Sheppard, B. H. (1988)	✓						✓	✓									✓
Buyer characteristics of the green consumer and their implications for advertising	Shrum, L. et.al. (1995).	✓							✓	✓			✓					✓

2.4 Research Gap

India has the second-largest population in the world. Currently, renewable energy initiatives in India have boosted the solar industry. It has further helped the nation become the second most attractive market in the world for equipment related to renewable energy. Deployment of solar projects and the production of solar energy have gone up substantially in India. However, there are still some grey areas in the adoption of Solar Energy. Thus, proposed research undertaken Theory of Planned behaviour, with Technology Readiness, and Sustainability Orientation as a pivotal factors to understand the purchasing behaviour of Solar Renewable Energy products by consumers. Many researchers undertaken, Theory of Planned Behaviour, which has been extensively applied in many studies on matters related to environmental aspect of behaviour such as recycling (Chan K. , 1998); (Shaw, 2008); (Begum, 2009); (T.Ramayh, 2012), water saving technology (Lynne G. C., 1995), environmental attitude (Kaiser, 1999), ethical behaviour (Hopfenbeck, 1993), factors influencing consumers to purchase the residential units (household consumers) (Numraktrakul, 2012), (Phungwong, 2010), and Institutional consumers(Hotel, Hospital, Education Institutions Industrial agencies, etc.) (Vivek Verma, 2017). It has extensively applied in the purchasing of environmentally sustainable products with environmental knowledge factor to accomplish the strategic framework (B.kumar, 2012), but a very few research conducted on particularly Solar Products, and identifying Technology Readiness and Sustainability Orientation as an additional factors with Theory of Planned Behaviour. Therefore, the proposed research main purpose is to develop a strategic framework for more comprehensible understanding of Purchasing Behaviour of Solar Renewable Energy Products by Potential consumers in India.

SECTION 3

NEED OF STUDY

India is emerging as one of the major solar energy markets in the world and in the process of catching up with the two leading countries like China and the US. Currently, India ranks as the third-largest solar market in the world. The Indian government has set a target to reach 100 GW of solar capacity by 2022. In 2018, the country's cumulative solar capacity was 28 GW, and in 2019, it is already set for a record solar capacity additions India is emerging as one of the major solar energy markets in the

world and in the process of catching up with the two leading countries like China and the US. Currently ,India ranks as the third-largest solar market in the world. The Indian government has set a target to reach 100 GW of solar capacity by 2022. In 2018, the country's cumulative solar capacity was 28 GW, and in 2019, it is already set for a record solar capacity additions (Chakrabarti, 2019).

A report by (mercomindia, 2019),shows that solar installations in India have reached 8.3 GW in recent times, including rooftop solar panels and large-scale solar units. On a year-to-year basis, the share of solar capacity in India went up from 6.6% in March 2018 to 8.4% in March 2019. Currently, as many as 80 large-scale projects are in the pipeline of 5 MW capacity or more Besides large-scale projects, installations of rooftop solar panels also continue to go up. Statistics show that, installations were up by 15.6% compared to 1,641 MW installed in Q4 2018. In Q4 2019, the large-scale solar projects came to 1,593 MW, while rooftop solar installations accounted for 304 MW, an increase of 24.1% compared to 245 MW installed in Q3 2019.

Rooftop solar has been around in India for some time now with consumers in all four major segments - commercial, industrial, residential and public sector buildings. Despite of such intense Solar harnessing techniques, government initiatives, policies, frameworks, consumer adoption is still questionable. Residential consumers, Commercial and Industrial consumers in India still have not completely adopted the rooftop solar panels. So, the proposed research would help to understand the purchase behaviour of Solar Renewable Energy Products by potential consumers taking into the consideration of Theory of Planned Behaviour, Technology readiness, Sustainability Orientation factors, especially in reference to Agra region , where this type of study never been conducted in spite of having 87kmsq. area, having 15.9 lakhs population(2011), and approximately having 100 solar dealers within it's region. Since Corona virus pandemic creates a halt to livelihood and drastically changes the trade environment, it is the dire need to understand whether the current scenario destructed the Solar Industry, by switching the supply of solar product within the Nation, and how potential customers retaliate this crying need.

SECTION 4

CONCEPTUAL FRAMEWORK

The conceptual framework has been derived from literature review and rooted with Seven prime variables i.e. Technology Readiness, Sustainability Orientation, Perceived Behavioural Control, Subjective Norms, Attitude, purchase intention, Purchase Behaviour. The framework for conceptual framework has been derive from Antecedent, Behaviour, Consequence framework also known as "ABC", ABC falls under the umbrella of applied behaviour analysis, which is based on the work of (Skinner, 2020). Whereby, the Technology Readiness, Sustainability Orientation, Perceived Behavioural Control, Subjective Norms acted as an antecedent and further Attitude as behaviour and the consequence it brings in consumer behaviour in way of purchase intention, Demography, Macro Environmental factors acted as trigger/moderator for driving certain Attitude and consumption.

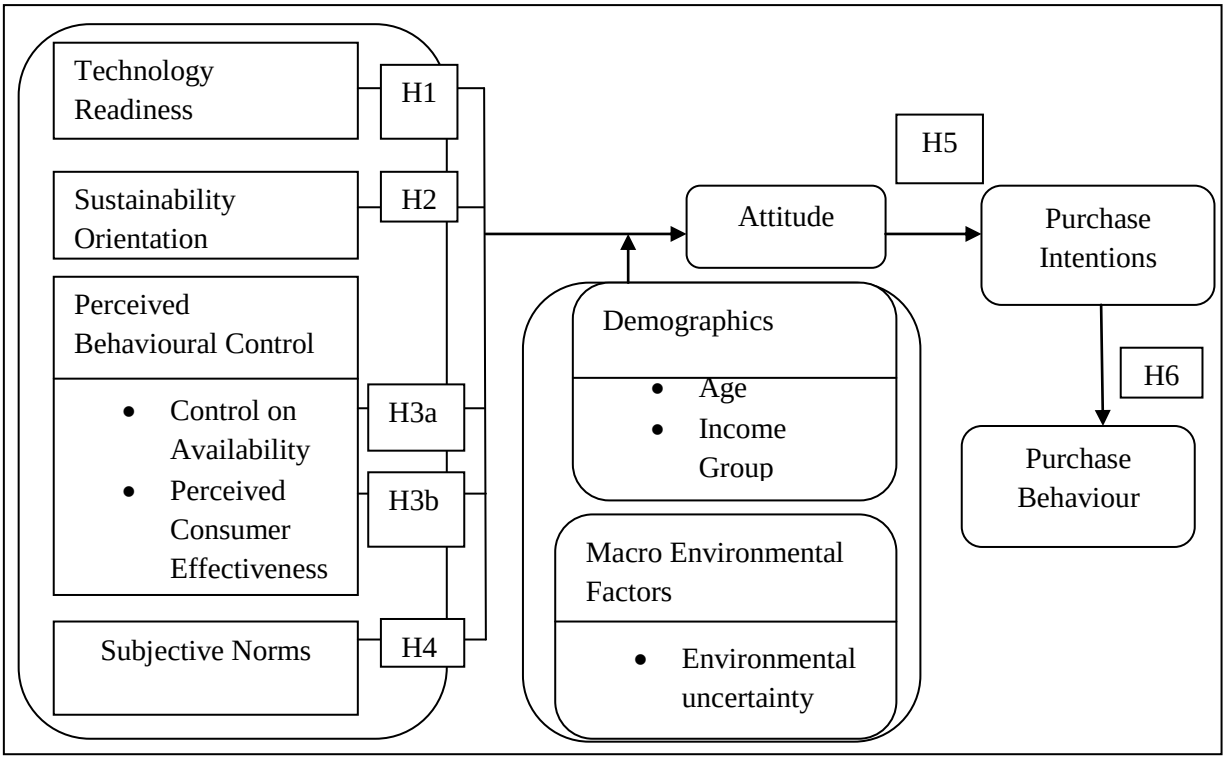

Figure2: Conceptual Framework (Source: Researcher's Construct inspired from Ajzen, 1991)

SECTION 5

5.1 OBJECTIVES

The following are proposed objectives has been derived collectively from literature review:

Objective 1: To study the influence of identified factors on Attitude towards Solar Renewable Energy Products.

Objective 2. To study the influence of Attitude on Purchase Intentions towards Solar Renewable Energy Products.

Objective 3: To study the influence of Purchase Intentions on Purchase Behaviour towards Solar Renewable Energy Products.

Objective 4: To provide a recommended model based on the result obtained.

5.2 HYPOTHESIS

The conceptual framework model hypothesize that Technology Readiness, Sustainability Orientation, Subjective Norms, and Perceived Behavioural Control are antecedents to formation of Attitudes, and purchase intention and purchase Behaviour are their consequences. So, the study will be carried out in order to test the following hypotheses and are drawn on the bases of following facts and previous researches.

5.2.1 Technology Readiness and Attitude:

Technology readiness (TR) refers to people's propensity to embrace and use new technologies for accomplishing goals in home life and at work (Liljander, 2006); (Colby, 2001). Customers use the new technologies to produce and consume services, Although, many literatures have studied customer reactions with new technologies or e-related service e.g. (Haque A, 2009) ; (Jahangir N, 2009), scholarly research on people's readiness to use technology-based systems is sparse. (Li, 2010), prompted to explore the linkage between Technology Readiness and Attitude. Therefore, the following hypothesis is established:

H_o1: Technology Readiness does not positively influence Attitude of potential consumers towards Solar Renewable Energy Products.

H_a1: Technology Readiness positively influences Attitude of potential consumers towards Solar Renewable Energy Products.

5.2.2 Sustainability Orientation and Attitude:

Sustainability Orientation Refers to the level of concern about the environmental protection and social responsibility of individuals, and consists of items that measure the underlying attitudes and personal traits on environmental protection and social responsibility (wanger, 2010) . Satisfaction of human needs, and need of protecting and conserving the natural environment, are the main notions that inculcated in sustainability. (wanger, 2010), prompted the linkage between Sustainability Orientation and Attitude. Therefore, the following hypothesis is established:

H_o2: Sustainability Orientation does not positively influence Attitude of potential consumers towards Solar Renewable Energy Products.

H_a2: Sustainability Orientation positively influences Attitude of potential consumers towards Solar Renewable Energy Products.

5.2.3 Perceived Behavioural Control and Attitude:

Perceived behavioural control refers to the perceived difficulty or ease of performing the behaviour (Ajzen, 1985). Perceived behavioural control has a linkage with Attitude has shown in various contexts, such as sustainable dairy consumption behaviour (Vermeir, 2006), behaviour towards technology investment (Lynne G. D., 1995) , ethical decision making in the medical profession (Gibson, 1991) . Therefore, the following two hypotheses established:

H_o3a: Control on availability does not positively influence Attitude of potential consumers towards Solar Renewable Energy Products.

H_a3a: Control on availability positively influences Attitude of potential consumers towards Solar Renewable Energy Products.

H_o3b: Perceived Consumer Effectiveness does not positively influence Attitude of potential consumers towards Solar Renewable Energy Products.

H_a3b: Perceived Consumer Effectiveness positively influences Attitude of potential consumers towards Solar Renewable Energy Products.

5.2.4 Subjective Norms and Attitude:

Derived from the Theory of Planned Behaviour (Ajzen I. , 1991), subjective norm refers to the belief about whether most people approve or disapprove of the particular behaviour. The linkage between

Subjective Norms and Attitude has been found in various studies, such as buying organic foods and organic personal care products (Samantha Smith, 2010); (Anssi Tarkiainen, 2005), intention to buy environmentally friendly products ((Kalafatis, 1999); (Wahid, 2011)) , Psychosocial factors influencing shared bicycle travel choices (Zhang Xin1, 2019). Therefore, the following hypothesis established.

H_o4: Subjective Norms does not positively influence Attitude of potential consumers towards Solar Renewable Energy Products.

H_a4: Subjective Norms positively influences Attitude of potential consumers towards Solar Renewable Energy Products.

5.2.5 Attitude and Purchase Intention:

Attitude has been defined as a mental and neural state of readiness (Allport, 1935).The Attitude factor been aptly undertaken by (Schultz, 2000), who define it by taking into account the attitude towards environmental concerns, whereas consumer's purchasing intentions are dependent upon his or her environmental attitudes been aptly undertaken by (Irland, 1993). The linkage between Attitude and Purchase Intentions been carried out in several studies (Chan R. , 2001); (Verbeke, 1999) (Tanner, 2003); (Vermeir, 2006) . Therefore, the following hypothesis established:

H_o5: Attitude does not positively influence Purchase Intentions of potential consumers towards Solar Renewable Energy Products .

H_a5: Attitude positively influences Purchase Intentions of potential consumers towards Solar Renewable Energy Products .

5.2.6 Purchase Intention and Purchase Behaviour:

According to (Ajzen I. , 1991),Behaviour can be determined from the intention with considerable accuracy.Various studies the linkage between Purchase Intentions and Purchase Behaviour (Saba, 2003) (Thøgersen, 2007); (Ajzen I. M., 1980); (Sheppard, 1988). Therefore,the following hypothesis established:

H_o6: Purchase Intentions does not positively influence Purchase Behaviour of potential consumers towards Solar Renewable Energy Products.

H_a6: Purchase Intentions positively influences Purchase Behaviour of potential consumers towards Solar Renewable Energy Products.

SECTION 6

RESEARCH METHODOLOGY

6.1 Research Design

For the proposed research descriptive Research design has been adopted with the intention to elaborate an accurate representation of persons, events or situations (Saunders, 2019), relies on online questionnaire.

6.2 Scope of the study

Solar Renewable Energy sector has been chosen for the proposed study because solar power in India is a fast developing industry. The country's solar installed capacity reached 34.045 GW as of 31 January 2020 ,thus forms the major backbone of the Renewable industry. The study focuses on North India Region and, it covers Potential consumers who adopt solar technology or at least have an intention to do so. The proposed research main goal is to understand how far solar technology been incorporated at home and work player by consumers, or at least have an intention to do so.

6.3 Sample Design:

As the sample frame is wide and infinite and consists of heterogeneous population, the sample will be non-probabilistic, comprising of consumer, to minimize the possibility of bias multi-layer sampling has been proposed- Purposive sampling, and Judgment Sampling:

Purposive Sampling: Purposive sampling will be used at the first stage to target the respondents using online questionnaire distribution, to reach potential/target customer using Solar Technology and Suppliers of Solar Energy chosen, as they will be able to provide specific knowledge about topic of study.

Judgmental Sampling: At the second stage, Judgmental Sampling will be used as the small sample group members are selected on the basis of judgement of experts.

6.4 Sample size

The population from which sample needs to be drawn is infinite in nature. Since the proposed research requires huge sample size, therefore, following sample size formula for infinite population (more than

50,000) through precision rate and confidence level approach is used to arrive at a representative number of respondents when population estimate is unknown (Godden, 2004):

$$SS = \frac{Z^2 \times p \times 1 - p}{C^2}$$

Where, SS = Sample Size

Z = Z-value (e.g., 1.96 for a 95 percent confidence level)

P = Percentage of population picking a choice, expressed as decimal.

C = Confidence interval, expressed as decimal.

In order to minimize the bias and obtain realistic sample size, three scenarios are evaluated-

- Scenario I Estimating 10% of population with 6% Margin of Error.
- Scenario II Estimating 30% of population with 5% Margin of Error.
- Scenario III Estimating 50% of population with 4% Margin of Error.

Table 2: Sample Size (Source: Self-construct)

Scenario	Population Scenario	Z value at 95% confidence level	Margin of Error	Sample size calculation	Sample size
I	10%	1.96	6%	(1.96)^2*.1(1-.1)/(.06)^2	96.04
II	30%	1.96	5%	(1.96)^2*.3(1-.3)/(.05)^2	253.69
III	50%	1.96	4%	(1.96)^2*.5(1-.5)/(.04)^2	550.25
Total					899.98
Average					299.99

Hence, the proposed sample size for the study will be **300**.

Relevant Case Study shall also be considered for Data collection.

6.5 Source of Data Collection:

6.5.1 Primary Data Collection

Primary research is set up by surveys, sampling, questionnaire, testing and analytical issues in order to understand the attitudes and purchase intentions and its impact on for the Purchase Behaviour of customer.

Basically, the questionnaire was designed and separated into two parts, first part of questionnaire includes demographic data and trip characteristics, gender, age, annual income etc. were collected and second part is about Technology Readiness, Sustainability Orientation, Subjective Norms, Perceived Behavioural Control, Attitude, Purchase Intention and Purchase Behaviour.

6.5.2 Secondary Data:

With respect to the dynamic nature of the research, secondary data will provide the information and facts related to study. Thus, secondary data, for the study will be collected from the following sources:

- Journals
- Research Reports
- Renewable Energy Industry India
- Ministry of New and Renewable Energy
- UPNEDA(Uttar Pradesh New & Renewable Energy Development Agency)
- McKinsey& Company
- Magazines
- Books.

6.6 Statistical tool to be used:

Structural Equation Modelling (PLS- SEM) will be used as the statistical approach for data analysis, and to test the given hypotheses. Bollen (1989) explained that SEM is a general statistical framework for many multivariate statistics such as regression analysis ,path analysis, factor analysis, ANOVA, canonical correlation analysis. The decision to apply Structural Equation Modelling in this study is because, it has the ability to represent the unobserved concepts and constructs, that are lacking in the previous literature. Also, having large number of variables in the framework, Structural Equation Modelling being the prominent Technique for depicting the complex relationships among variables visually. Further, other relevant inferential statistical tools such as descriptive statistics etc. would be used for data analysis.

Table 3: Statistical Tool

S. No.	Objectives	Methodology
1.	To study the influence of identified factors on Attitude towards Solar Renewable Energy Products.	Primary data collection would be done from the respondents using questionnaire survey and secondary data sources would also be used. Inferential statistical tools like PLS-SEM (Partial Least Square-Structural Equation Model).
2.	To study the influence of Attitude on Purchase Intentions towards Solar Renewable Energy Products.	Structural Equation Modelling, Correlation and Regression, and other relevant inferential statistical tools such as descriptive statistics etc. would also be used.
3.	To study the influence of Purchase Intentions on Purchase Behaviour towards Solar Renewable Energy Products.	Confirmatory Factor Analysis, Structural Equation Modelling, and other inferential statistical tools would be used.
4.	To provide a recommended model based on the result obtained.	Data would be collected from respondents using questionnaire survey and data from secondary sources would also be used. Also, Structural Equation Modelling would as be used.

SECTION 7

PROPOSED CHAPTERIZATION

The Proposed Research will comprise following chapters:

- Chapter 1: Introduction
- Chapter 2: Review of Literature
- Chapter 3: Consumer Attitude and Purchase Intentions for Solar Products.
- Chapter 4: Research Design and Methodology
- Chapter 5: Data Collection and Analysis
- Chapter 6: Result and Interpretation
- Chapter 7: Conclusion
- Chapter 8: Direction for Future Research and Limitations
- Bibliography and References
- Appendix

SECTION 8

REFERENCES

1.Ajzen. (1985). From intention to actions: A theory of planned behavior. *Springer-Verlag* , 11-39.

2.Ajzen, I. &. (1975). Attitude-behaviour relations: a theoretical analysis and. *Psychological Bulletin* , 888-918.

3.Ajzen, I. M. (1980). Understanding Attitudes and Predicting Social Behaviour. *Englewood Cliffs, NJ: Prentice-Hall* .

4.Ajzen, I. (1991). The theory of planned behavior. Organizational Behaviour and Human Decision Processe. *Englewood Cliffs, NJ: Prentice-Hall* , 50.

5.Allport, G. (1935). Attitudes. In Handbook of Social Psychology. Worcester: Clark University Press.

6.Anssi Tarkiainen, S. S. (2005). Subjective norms, attitudes and intentions of Finnish consumers in buying organic food. *British Food Journal* , 808-822.

7.B.kumar. (2012, 08 12). Theory of Planned Behaviour Approach to Understand the Purchasing Behaviour for Environmentally Sustainable Products. ahemdabad, gujarat, india: Reasearch and publications.

8.Begum, R. S. (2009). Attitude and behavioural factors in waste management in the construction industry of Malaysia. *Resources, Conservation and Recycling* , 321-328.

9.Chan, K. (1998). Mass communication and pro-environmental behaviour: waste recycling in . *Journal of Environmental Management* , 317-325.

10.Chan, R. (2001). Determinants of Chinese consumers' green purchase behaviour. *Psychological and Marketing* , 389-413.

11.Colby, P. a. (2001). *Techno-Ready Marketing: How and Why Customers Adopt Technology.* Simon and Schuster.

12.Davis FD, B. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Manage Sci* , 982-1003.

13.Dodds, W., Monroe, K., & gerawal, D. (1991). Effect of price,brand and information on buyers' product evaluation. *journal of marketing research* , 307-319.

14.Duncan, R. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *administrative science quarterly* , 313-327.

15.Florian G. Kaiser, m. R. (1999). Ecological Behavior, Environmental attitude and feelings of responsibilty for the environment. *European Psychologist* , 59-74.

16.Gibson, R. a. (1991). Influence of ethical decision making in the medical profession. *springer* , 20.

17.Godden, B. (2004). Sample size formulas. *Journal of Statistics* .

18.Haque A, T. A. (2009). "Electronic transaction of internet banking and its perception of Malaysian online customers. *Afr. J. Bus. Management* , 248-259.

19.Hasenauer, G. (2016). Technology Readiness,Market Readiness,and triple bottom line:An empirical analysis of innovating startups in an incubatr. *PICMET* (pp. 1-84). honolulu,USA: Technology Management for Social Innovation.

20.Holmes, D. C. (2010). Technology Readiness. *Research-Technology Management* , 52-59.

21.Hopfenbeck, W. (1993). The green management revolution: Lessons in environmental . *Englewood Cliffs, NJ: Prentice Hall.* .

22.Iris Vermeir, W. V. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of. *Elsevier Journal* , 542-553.

23.Irland, L. (1993). Wood producers face green marketing era: Environmentally Sound . *Wood Technology* , 1-34.

24.J, B. (1995). The prediction of household recycling of newspapers: The role of attitudes, intentions, and situational factors. *Journal of Applied Social Psychology* , 440-462.

25.Jahangir N, B. N. (2009). The role of perceived usefulness,perceived ease of use, security and privacy, and customer attitude toengender customer adaptation in the context of electronic banking. *Afr. J. Bus. Manage* , 32-40.

26.Jennifer portz, e. a. (2019). Using the Technology Acceptance Model to Explore User Experience, Intent to Use, and Use Behavior of a Patient Portal Among Older Adults With Multiple Chronic Conditions: Descriptive Qualitative Study. *journal of medical internet research* , vol.21.

27.Justin paul, a. m. (2016). Predicting green product consumption using theory of planned Behavior and reasoned action. *journal of retailing and comsumer services(elsevier)* , 123-134.

28.Kaiser, G. W. (1999). Environmental attitude and ecological . *Journal of Environmental Psychology* , 1-19.

29.Kalafatis, S. P. (1999). “Green marketing and Ajzen’stheory of planned behavior: a cross-market examination. *Journal of Consumer marketing* , 441–460.

30.L.G., S., & kanuk, L. (2000). consumer behavior. *wisconsin:prentice hall* .

31.Li, S.-C. C.-H. (2010). Consumer adoption of e-service: Integratingtechnology readiness with the theory of planned behavior. *African Journal of Business Management* , 3556-3563.

32.Liljander, e. (2006). Technology readiness and the evaluation and adoption ofself-service technologies. *Journal of Retailing and Consumer Services* , 177–191.

33.Liska, A. (1984). A critical examination of the causal structure of the Fishbein/Ajzen . *Social Psychology* , 61-74.

34.Lucia Mannetti, A. P. (2004). Recycling: Plannedandself-expressive behaviour. *Journal of Environmental Psychology* , 227–236.

35.Lynne, G. D. (1995). Conservation Technology Adoption Decisions and the Theory of Planned Behavior. *Journal of Economic Psychology* , 581-598.

36.Mathieson, K. (1991). Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior. *Information systems research* , 173-239.

37.Numraktrakul, P. N. (2012). Factors Affecting Green Housing Purchase. *17th International Business Research Conference.* canada.

38.PARK, D. S. (2014). *Patent No. US 2014/0067547 A1* . US.

39.Parsuraman.A. (2000). Technology Readiness Index: a Multiple item scaleto meaure Readiness to embrace new technologies. *JOURNAL OF SERVICE RESEARCH* , 307-320.

40.Phungwong, O. (2010). Factors influencing home purchase intention of Thai single people. *International graduate school of business,*. adelaide.

41.PRASAD, N. T. (2020, 03 27). *google chrome*. Retrieved 03 31, 2020, from google: http//corornavirusimpactonsolarIndianSolarIndustryConfrontsCoronavirusCrisisMercomIndia.html

42.Saba, A. &. (2003). Attitudes towards organic foods and risk/benefit perception associated with pesticides. *Food Quality and Preference* , 637-645.

43.Samantha Smith, A. P. (2010). Eating clean and green? Investigating consumer motivations towards the purchase of organic food. *Australasian Marketing Journal* , 93-104.

44.Saunders, M. N. (2019). *RESEARCH METHODSFOR BUSINESS STUDENTS.* new york: Pearson Education Limited.

45.Schultz, P. &. (2000). Promoting environmentalism. *The Journal of Social issues* , 443-457.

46.Shaw, P. (2008). Nearest neighbour effects in kerbside household waste recycling. *Resources, Conservation and Recycling* , 775-784.

47.Sheppard, B. H. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *journal of Consumer Research* , 325-343. .

48.Shrum, L. J., McCarty, J. A., & Lowrey, T. M. (1995). Buyer characteristics of the green consumer and their implications for advertising. *Journal of Advertising* , 71-82.

49.sommerfeld, j. (2017). nfluence of demographic variables on uptake of domestic solar photovoltaic technology. *Renewable and Sustainable Energy Reviews* , 315-323.

50.T.Ramayh, j. w. (2012). Sustaining the environment through recycling: An empirical study. *journal of enviromental management* , 141-147.

51.Tanner, C. &. (2003). Promoting sustainable consumption: Determinants of green . *Psychology and Marketing* , 883-902.

52.Tawfik Salah Al-Nahdi, O. H. (2015). The Effect of Attitude, Dimensions of Subjective Norm, and perceived behavioral control on to the intention to purchase real state in Saudi Arabia. *International Journal of Marketing Studies* , 12.

53.Thøgersen, J. (2007). Consumer Decision Making with Regard to Organic Food Products, In Vaz, M.T.D.N., Vaz, P., Nijkamp, P. and Rastoin, J.L. (Eds). *Traditional Food Production Facing Sustainability: A European Challenge* .

54.todd, t. a. (1995). An Integrated Model of Waste Management Behavior: A Test of Household Recycling and Composting Intentions. *sage journal* , 603-630.

55.v.a, Z. (1988). consumers perception of price, quality and value:a means end model and synthesis of evidenece. *journal of marketing* , 2-22.

56.Verbeke, W. &. (1999). Consumer attitude to beef quality labels and associations . *Journal of International Food and Agribusiness* , 45-65.

57.Vermeir, I. &. (2006). Sustainable food consumption: exploring the consumer attitude-behavioural intention gap. *Journal of Agricultural and Environmental Ethics* , 1-14.

58.Vivek Verma, B. C. (2017). An application of theory of planned behavior to predict young Indian consumers' green hotel visit intention. *Journal of Cleaner Production* , 1-11.

59.Wahid, N. A. (2011). Factors influencing green purchase behaviour of Penangenvironmental volunteers. *International Business Management* , 38-49.

60.wanger, K. a. (2010). The influenece of sustainability Orientation on Entrepreneurial Intentions-Investigating the role of business experience. *Journal of Business Venturing* , 524-539.

61.Zhang Xin1, M. L. (2019). Psychosocial factors influencing sharedbicycle travel choices among Chinese: Anapplication of theory planned behavior. *PLOS ONE* , 1-17.

Websites:

1. Agency, U. P. (2020, 03 03). *Google chrome*. Retrieved 12 31, 2019, from upneda.org.in: http://upneda.org.in/
2. Bhagwan Das, A. K. (n.d.). *google chrome.* Retrieved 10 7, 2019, from www.dei.ac.in: https://www.dei.ac.in/
3. Council, N. R. (2019). *Google chrome*. Retrieved from www.nrdc.org: https://www.nrdc.org.
4. Chakrabarti, S. (2019, 08 21). Solar statistics in india.
5. Council, N. R. (2019). *Google chrome*. Retrieved from www.nrdc.org: https://www.nrdc.org.
6. D. Bhagwan Das, A. K. (n.d.). *google chrome.* Retrieved 10 7, 2019, from www.dei.ac.in: https://www.dei.ac.in/Solar Energy Initiatives At The Dayalbagh Educational Institute.
7. Energy, M. o. (2020, 1, 1). *Google chrome*. Retrieved from mnre.gov.in: https://mnre.gov.in/new-technologies
8. Energy sage. (2019, 08 30). *Google chrome*. Retrieved from news.energysage.com: https://news.energysage.com

9. India, R. E. (2019, December). *Google Chrome*. Retrieved 1 1, 2020, from www.ibef.org: https://www.ibef.org/industry/renewable-energy.aspx
10. International, S. E. (2018, 1 2). *Google chrome*. Retrieved 11 23, 2019, from www.saurenergy.com: https://www.saurenergy.com/
11. Mckinsey. (2020, 3 2). *:McKinsey and company*. Retrieved 4 1, 2020, from www.mackinsey and comapny.com: http;//www.mckinsey and company.com
12. Mercomindia. (2019, 12). *google chrome.* Retrieved 1 6, 2020, from www.mercomindia.com: https://mercomindia.com/
13. Research, M. I. (2020, 1 2). *google chrome*. Retrieved from www.mercomindia.com: https://mercomindia.com
14. Skinner, B. (2020, 1 29). *Google chrome*. Retrieved 2 12, 2020, from www.google.com: https://www.google.com/search
15. Solar, V. (2016, 11 23). *Google chrome*. Retrieved 1 2020, from www.vikramsolar.com: https://www.vikramsolar.com/
16. Wikipedia. (2020, 05 11). *Google chrome*. Retrieved 05 16 , 2020, from en.m.wikipedia.org: https://en.m.wikipedia.org/wiki/Solar_power_in_India.